Environmental Toxin Exposure, Generalized Anxiety, and Perceived Health Symptoms

Erica S. Kornblith[1] and Rosemarie M. Bowler[2]

[1]California School of Professional Psychology at Alliant International University

[2]San Francisco State University

This study examined the relationships among environmental toxin exposure, generalized anxiety symptoms, and perceived health symptoms among a sample of community-dwelling adults in Southeastern Ohio, USA. Data was obtained from a larger EPA-sponsored study comparing two Ohio towns exposed to environmental manganese (Mn), Marietta and East Liverpool, with a third, unexposed control town (Mt. Vernon). Mn is a naturally-occurring element that is essential for normal functioning and is found in the body in small amounts (ATSDR, 2000). However, Mn is toxic in large doses, and excessive Mn exposure is most often associated with parkinsonian-like motor symptoms (Feldman, 1999). Mn exposure is also associated with cognitive and mood symptoms (Bowler et al., 2007) and adverse physical health consequences (ATSDR, 2000). Linear dose-effect relationships between Mn exposure and cognitive and motor symptoms (Bowler et al., 2007) as well as mood symptoms (Bowler et al., 2012) have been documented, indicating that more exposure results in more severe symptoms.

Individuals with Mn exposure have been shown to experience higher levels of mood disruption compared with non-exposed individuals (Bowler et al., 1999), and anxiety is often one of the first reported symptoms of Mn intoxication (Mergler, 1994). Furthermore, anxiety, as well as other affective processes, have been shown to impact an individual's perception of his or her physical health (Howren & Suls, 2011).

The current study examined only adult residents of the exposed towns: 31 men and 55 women from East Liverpool, aged 30 to 74; and 45 men and 55 women from Marietta, aged 30 to 70. Mn exposure is defined as distance in air-miles from the Mn source: shorter distance equals higher Mn exposure (M=3.08, SD=2.2). Anxiety symptoms were measured using the computed SCL90-R score of the generalized anxiety syndrome described by Bowler and colleagues (2012), (M=52.95, SD=8.33). Perceived health was measured as the total number of symptoms out of 72 endorsed on a Health Study Questionnaire (M=14.45, SD=11.24).

A moderator analysis examined whether Mn exposure moderates the relationship between anxiety symptoms and number of health symptoms. Results indicated that whereas exposure did not uniquely predict number of perceived health symptoms (*b=.205, t=.547, p>.05*), there was a main effect for anxiety symptoms (*b=.803, t=8.379, p<.001*). Additionally, results indicate that exposure moderated the relationship between anxiety symptoms and perceived health symptoms (*b=.136, t=2.721, p<.001*), such that participants with higher exposure and higher anxiety reported more health symptoms than those with higher exposure and lower anxiety; but for those participants with lower exposure, those with higher anxiety reported more health symptoms than those lower anxiety. These findings suggest that,

because anxiety may have a greater impact on health symptoms at low Mn exposure than at high exposure , these two variables work in concert to influence an individual's perception of mental and physical symptoms reported.

Accepted for presentation at American Psychological Association Annual Convention, Honolulu, Hawaii July 31-August 4, 2013

Note: This abstract does not necessarily reflect EPA policy